

in series to a first terminal of transformer 741. A second terminal of transformer 741 connects to a ground. A third terminal and fourth terminal of transformer 741 connects to nodes 761-762. Resistor 732 connects in parallel to nodes 761-762. Resistor 733 connects switch 726 to node 761. Resistor 734 connects switch 726 to node 762. Nodes 761-762 are referred to in FIG. 7 by arrows for illustrative purposes and those skilled in the art will appreciate that nodes 761-762 are defined by Kirchhoff's Law.

Resistor 731 is a 0 – 120 ohm variable resistor. Transformer 741 is a 75 ohm unbalanced/ 1800 ohm balanced transformer. Resistor 732 is a 2200 ohm resistor. Resistor 733 is a 5100 ohm resistor. Resistor 734 is a 5100 ohm resistor. Switch 726 is a pushbutton two-circuit switch.

In operation, signal generator 743 generates a noise signal. If switch 726 connects noise simulator system 700 to a system carrying a service provider signal, noise simulator system 700 applies the noise signal to the service provider signal. Noise simulator system 700 is a high-impedance noise system. Noise simulator system 700 is tunable so that the noise signal represents both near-end cross talk and far-end cross talk. A more detailed description of the operation of noise simulator system 700 is left out for the sake of brevity because one skilled in the art would understand the operation without undue experimentation by looking at FIG. 7.

Those skilled in the art will appreciate variations of the above-described embodiments that fall within the scope of the invention. As a result, the invention is not limited to the specific examples and illustrations discussed above, but only by the following claims and their equivalents.

## CLAIMS:

I claim:

1. A simulation system configured to simulate a length of communication media for a service provider, the simulation system comprising:

a communication media simulator system comprising:

an interface system configured to communicate with a service

5 provider communication link, and

a tunable simulator system configured to receive a service provider signal from the interface system, apply a first load to the service provider signal to simulate the length of communication media, and vary the first load to adjust the length of communication media simulated.

10

2. The simulation system of claim 1 wherein the communication media comprises a wire.

3. The simulation system of claim 1 further comprising an output system configured to:

15

determine simulation results from the communication media simulator system; and

transmit the simulation results to a user interface.

20

4. The simulation system of claim 1 wherein the tunable simulator system comprises a variable resistor.

5. The simulation system of claim 1 wherein the tunable simulator system comprises a variable inductor.

25

6. The simulation system of claim 1 wherein the tunable simulator system comprises a variable capacitor.

7. The simulation system of claim 1 further comprising:

30

a control system configured to automatically vary the first load to adjust the length of communication media simulated.

8. The simulation system of claim 1 further comprising:

a noise simulator system configured to:

generate a noise signal; and

5                    apply the noise signal to the service provider signal to simulate noise interference.

9. The simulation system of claim 8 wherein the noise simulator system is further configured to:

10                  vary the noise signal to adjust the noise interference simulated.

10. The simulation system of claim 9 further comprising:

a control system configured to automatically vary the noise signal to adjust the noise interference simulated.

11. The simulation system of claim 8 wherein the noise signal represents near-end cross talk.

12. The simulation system of claim 8 wherein the noise signal represents far-end cross talk.

13. The simulation system of claim 1 further comprising:

a bridge tap simulator system configured to:

receive the service provider signal;

25                  apply a second load to the service provider signal to simulate an unterminated bridge tap.

14. The simulation system of claim 13 wherein the bridge tap simulator system is further configured to:

30                  vary the second load to simulate a variable length of wire connected to the bridge tap.

15. The simulation system of claim 14 further comprising:

a control system configured to automatically vary the second load to simulate the variable length of the wire connected to the bridge tap.

5

16. The simulation system of claim 1 further comprising:

a switch system connected to the communication media simulator system that is configured to connect the communication media simulator system to other communication media simulator systems to simulate other conditions.

10

17. The simulation system of claim 1 wherein the service provider signal comprises a signal for Digital Subscriber Line (DSL) service.

18. The simulation system of claim 1 further comprising:

an enclosure configured to house the communication media simulator system.

19. A method of operating a simulation system to simulate a length of communication media to a service provider, the method comprising:

receiving a service provider signal from the service provider;

applying a first load to the service provider signal to simulate the length of communication media; and

tuning the first load to adjust the length of communication media simulated.

25

20. The method of claim 19 wherein the communication media comprises a wire.

21. The method of claim 19 further comprising:

determining simulation results responsive to applying the first load; and

transmitting the simulation results to a user interface.

30

22. The method of claim 19 wherein tuning the first load comprises:  
tuning a variable resistor.

5 23. The method of claim 19 wherein tuning the first load comprises:  
tuning a variable inductor.

24. The method of claim 19 wherein tuning the first load comprises:  
tuning a variable capacitor.

10

25. The method of claim 19 wherein varying the first load to adjust the length of  
communication media simulated further comprises:  
varying the first load automatically using a control system.

15 26. The method of claim 19 further comprising:  
generating a noise signal; and  
applying the noise signal to the service provider signal to simulate noise  
interference.

20 27. The method of claim 26 further comprising:  
varying the noise signal to adjust the noise interference simulated.

25 28. The method of claim 27 wherein varying the noise signal to adjust the noise  
interference simulated further comprises:  
varying the noise signal automatically using a control system.

29. The method of claim 26 wherein the noise signal represents near-end cross  
talk.

30 30. The method of claim 26 wherein the noise signal represents far-end cross  
talk.

31. The method of claim 19 further comprising:

applying a second load to the service provider signal to simulate an unterminated bridge tap.

5

32. The method of claim 31 further comprises:

varying the second load to simulate a variable length of wire connected to the bridge tap.

10 33. The method of claim 32 wherein varying the second load to simulate the variable length of wire connected to the bridge tap further comprises:

varying the second load automatically using a control system.

34. The method of claim 19 further comprising:

15 connecting other loads to the first load using a switch system to simulate other conditions.

35. The method of claim 19 wherein the service provider signal from the service provider comprises a signal for Digital Subscriber Line (DSL) service.

20